What is claimed is:

1. A fiber optic coil, comprising an optical fiber wound without torsion about a central axis to form the coil, the coil having at least one winding, the winding having a pitch angle selected to result in a phase shift of circularly polarized light propagating through the fiber, said phase shift caused by Berry's phase, resulting in reducing effects of linear birefringence in the coil.

2. The coil according to claim 1, wherein the optical fiber is wound about the central axis in alternating, opposing winding directions, with a length of the fiber in a region where the winding direction changes being substantially smaller than the length of the fiber in either of the opposing winding directions.

3. The coil according to claim 1, wherein the central axis is generally in the shape of a circle.

4. The coil according to claim 3, wherein the circle surrounds a current carrying conductor, the coil serving as a current sensor with stabilized sensitivity resulting from the reduced effects of linear birefringence.

5. The coil according to claim 4, wherein the pitch angle is between 0° and 90°.

6. The coil according to claim 5, wherein the pitch angle is substantially equal to 60°.

7. The fiber optic coil of claim 1, wherein a current carrying conductor is placed generally along the central axis of the coil, the coil serving as a current sensor with stabilized sensitivity resulting from the reduced effects of linear birefringence.

8. The coil according to claim 7, wherein the pitch angle is between 0° and 90°.

9. The coil according to claim 8, wherein the pitch angle is substantially equal to 60°.

10. The coil according to claim 7, wherein the optical fiber is wound about the central axis in alternating, opposing winding directions, with a length of the fiber in a region where the winding direction changes being substantially smaller than the length of the fiber in either of the opposing winding directions.

11. The coil according to claim 7, wherein the coil is wound about a cylindrical form, the coil being disposed adjacent the cylindrical form.

12. The coil according to claim 11, wherein the form is slotted to allow placement of the conductor along the central axis.

13. The coil according to claim 7, wherein two counter-propagating light beams traverse the coil, a phase difference between the counter-propagating light beams being indicative of a magnetic field generated by the current carrying conductor.

14. The coil according to claim 13, further comprising:

(a) a quarter wave plate is connected at each respective end of the coil; and

(b) a coupler is connected to each quarter wave plate, the coupler receiving light from a source and splitting the light to form the two counter-propagating light beams traversing the coil.

15. The coil according to claim 14, further comprising a phase modulator connected between one of the quarter wave plates and the coupler to modulate the phase difference between the counter-propagating light beams to bias the current sensor to a more sensitive operating point.

16. The coil of claim 15, wherein the phase modulator is a piezo-electric transducer.

17. The coil of claim 15, wherein the phase modulator is an electro-optic material.

18. A fiber optic coil, comprising an optical fiber wound without torsion in a helical manner about a generally circular axis, the coil having at least one winding, the winding having a pitch angle selected to result in a phase shift of circularly polarized light propagating through the fiber, said phase shift caused by Berry's phase, resulting in reducing effects of linear birefringence in the coil.

19. The coil according to claim 18, wherein the circular axis surrounds a current carrying conductor, the coil serving as a current sensor with increased sensitivity resulting from the reduced effects of linear birefringence.

20. The coil according to claim 19, wherein the pitch angle is between 0° and 90°.

21. The coil according to claim 20, wherein the pitch angle is substantially equal to 60°.

22. A fiber optic coil, comprising an optical fiber wound without torsion in a helical manner about a central axis in alternating, opposing winding directions to form the coil, each winding having a pitch angle selected to result in a phase shift of circularly polarized light propagating through the fiber, said phase shift caused by Berry's phase resulting in reducing effects of linear birefringence in the coil, a length of the fiber in a region where the winding direction changes being substantially smaller than the length of the fiber in either of the opposing winding directions.

23. The coil of claim 22, wherein the pitch angle of each winding direction is substantially the same.

24. The coil according to claim 23, wherein a current carrying conductor is placed generally along the central axis of the coil, the coil serving as a current sensor with stabilized sensitivity resulting from the reduced effects of linear birefringence.

25. The coil according to claim 24, wherein the pitch angle is between 0° and 90°.

26. The coil according to claim 25, wherein the pitch angle is substantially equal to 60°.

27. A fiber optic coil, comprising:

(a) an optical fiber wound without torsion about a central axis to form the coil, the coil having at least one winding, the winding having a pitch angle substantially equal to 60° and selected to result in a phase shift of circularly polarized light propagating through the fiber, said phase shift caused by Berry's phase resulting in reducing effects of linear birefringence in the coil;

(b) a current carrying conductor placed generally along the central axis of the coil, the coil serving as a current sensor with stabilized sensitivity resulting from the reduced effects of linear birefringence; and

(c) two counter-propagating light beams traversing the coil, a phase difference between the counter-propagating light beams being indicative of a magnetic field generated by the current carrying conductor.

28. The coil according to claim 27, further comprising:

(a) a quarter wave plate is connected at each respective end of the coil; and

(b) a coupler is connected to each quarter wave plate, the coupler receiving light from a source and splitting the light to form the two counter-propagating light beams traversing the coil.

29. The coil according to claim 28, further comprising a phase modulator connected between one of the quarter wave plates and the coupler to modulate the phase difference between the counter-propagating light beams to bias the current sensor to a more sensitive operating point.

30. The coil of claim 29, wherein the phase modulator is a piezo-electric transducer.

31. The coil of claim 29, wherein the phase modulator is an electro-optic material.